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Recently, Hecker *et al.* [1] experimentally studied magnetoconductance fluctuations in a mesoscopic Au wire connected to a superconducting Nb contact. They compared the rms magnitude of these conductance fluctuations in the superconducting state [rms(G_{NS})] to that in the normal state [rms(G_N)] by increasing the magnetic field above the critical field of 2.5 T. It was reported that rms(G_{NS}) was about 2.8 ± 0.4 times larger than rms(G_N), which should confirm the theoretical predicted enhancement factor of $2\sqrt{2} \simeq 2.8$.

In this Comment, we show that their claim is not justified. Although not explicitly mentioned in Ref. [1], we have to assume that the rms(G) was calculated according to $\mathrm{rms}(G) = \mathrm{rms}(R)/R^2$, where rms($R$) denotes the rms magnitude of the measured resistance fluctuations and R the total measured resistance. The point we want to make is that the authors did not take into account the presence of an incoherent series resistance R_{series} from the contacts, which is different when the Nb is in the superconducting or normal state. Since the measured rms(R) originates only from the phase-coherent part of the disordered conductor, with resistance R_φ, the correct procedure is to calculate rms(G) according to $\mathrm{rms}(G) = \mathrm{rms}(R)/R_\varphi^2 = \mathrm{rms}(R)/(R - R_{\mathrm{series}})^2$. As shown below, when we correct for the presence of this series resistance, we find that rms(G_{NS}) is *not* significantly larger than rms(G_N).

Their device consists of a narrow Au wire (Au^w, length $L = 1.0$ μm, width $W = 0.13$ μm) connected at its ends to a macroscopic Nb and Au contact (Nb^c or Au^c) via a rectangular shaped contact (Nb^r or Au^r, $L = 0.8$ μm, $W = 1.6$ μm). The total resistance is the sum of these five contributions: $R = R_{\mathrm{Nb}}^c + R_{\mathrm{Nb}}^r + R_{\mathrm{Au}}^w + R_{\mathrm{Au}}^r + R_{\mathrm{Au}}^c$, where $R_{\mathrm{Nb}}^c + R_{\mathrm{Nb}}^r$ are zero in the superconducting state.

Since the series resistances of the Au contact ($R_{\mathrm{Au}}^c + R_{\mathrm{Au}}^r \simeq 1.2 R_\square^{\mathrm{Au}} \simeq 1.1$ Ω) are small compared to phase-coherent resistance of the Au wire (10.5 Ω), we will correct only for the series resistances of the Nb contact ($R_{\mathrm{Nb}}^c + R_{\mathrm{Nb}}^r \simeq 1.2 R_\square^{\mathrm{Nb}} \simeq 4.8$ Ω). This series resistance is present only in the normal state and is exactly equal to the increase in resistance when the magnetic field exceeds B_c (see Fig. 1(a), in Ref. [1]). We note that not only the macroscopic Nb contact is regarded to be incoherent but the rectangular shaped Nb contact as well. Namely, the phase-breaking length $L_\varphi \equiv \sqrt{D\tau_\varphi}$ for Nb is expected to be reduced compared to $L_\varphi \simeq 0.6$ μm for Au by $\sqrt{D_{\mathrm{Au}}/D_{\mathrm{Nb}}} \simeq 2.5$, which implies that the resistance fluctuations from this Nb rectangle are strongly suppressed due to ensemble averaging as well.

TABLE I. The measured resistance R_{NS} and uncorrected conductance fluctuations rms(G_{NS}) in the superconducting state at $T = 50$ mK and $B = 1$ T, and the measured resistance R_N and the *corrected* conductance fluctuations rms(G_N) in the normal state at $T = 50$ mK and $B = 4$ T.

	Sample 1	Sample 2
R_{NS} (Ω)	11.60	9.72
R_N (Ω)	15.87	14.34
rms(G_{NS}) (e^2/h)	0.16 ± 0.02	0.14 ± 0.02
rms(G_N) (e^2/h)	0.109 ± 0.006	0.109 ± 0.009
rms(G_{NS})/rms(G_N)	1.5 ± 0.2	1.3 ± 0.2

In Table I we have reproduced the measured (average) resistance of the two studied samples in the normal state and in the superconducting state. We did not correct rms(G_{NS}) [2]. The rms(G_N) has been corrected as described above. As a result, the rms(G_N) are a factor of $(R_N/R_{NS})^2 \simeq 2$ larger than reported in Ref. [1] and, consequently, the ratio rms(G_{NS})/rms(G_N) becomes about 1.4 ± 0.2. We doubt, however, that the remaining difference from 1 is significant, since the statistical error could well be larger than 0.2 due to the fact that only a few large fluctuations determine rms(G_{NS}) (see Figs. (1b) and 2, in Ref. [1]).

In conclusion, we have argued that the measured rms(G_{NS}) is not significantly enhanced compared to rms(G_N), and it remains an experimental challenge to observe the predicted enhancement factor of $2\sqrt{2}$.

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[1] K. Hecker, H. Hegger, A. Altland, and K. Fiegle, Phys. Rev. Lett. **79**, 1547 (1997).
[2] The reported values for rms(G_{NS}) are considerably smaller than the rms magnitude of the sample-specific conductance fluctuations of about rms(G_{NS}) $\simeq 1.0 e^2/h$ observed in both a cross-shaped and a T-shaped two-dimensional electron gas coupled to superconductors. S. G. den Hartog *et al.*, Phys. Rev. Lett. **77**, 4954 (1996); S. G. den Hartog *et al.*, *ibid.* **76**, 4592 (1996). A comparison with the normal state values was not made in these experiments.